

No.

8700090



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Holden's Foundation Seeds, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE
Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (U.S.C. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

CORN

'LH156'

Attest.

Kenneth H. Hearn
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service



In Testimony Whereof, I have hereunto set
my hand and caused the seal of the Plant
Variety Protection Office to be affixed
at the City of Washington, D. C.
this 15th day of January in
the year of our Lord one thousand nine
hundred and eighty-eight.

Richard E. Lyng
Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

FORM APPROVED: OMB NO. 0581-0065

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

1. NAME OF APPLICANT(S) Holden's Foundation Seeds, Inc.		2. TEMPORARY DESIGNATION Ex1120	3. VARIETY NAME LH156
4. ADDRESS (Street and No. or R.F.D. No., City, State, and Zip Code) R.R.#2, P.O. Box 839 Williamsburg, IA 52361		5. PHONE (Include area code) 319-668-1100	FOR OFFICIAL USE ONLY PVPO NUMBER 8700090
6. GENUS AND SPECIES NAME Zea mays	7. FAMILY NAME (Botanical) Gramineae		FILING DATE March 19, 1987 TIME 2:00 <input type="checkbox"/> A.M. <input checked="" type="checkbox"/> P.M.
8. KIND NAME Corn, Field	9. DATE OF DETERMINATION November 1985		AMOUNT FOR FILING \$ 1800.00 DATE March 19, 1987 AMOUNT FOR CERTIFICATE \$ 200.00 DATE November 13, 1987
10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.) Corporation			FEES RECEIVED
11. IF INCORPORATED, GIVE STATE OF INCORPORATION Iowa			12. DATE OF INCORPORATION 1968

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS
Mr. Mark Armstrong
P.O. Box 839
Williamsburg, IA 52361

PHONE (Include area code): 319-668-1100

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED

- a. ☒ Exhibit A, Origin and Breeding History of the Variety (See Section 52 of the Plant Variety Protection Act.)
b. ☒ Exhibit B, Novelty Statement.
c. ☒ Exhibit C, Objective Description of Variety (Request form from Plant Variety Protection Office.)
d. ☒ Exhibit D, Additional Description of Variety.
e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership.

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See Section 83(a) of the Plant Variety Protection Act.)

☐ Yes (If "Yes," answer items 16 and 17 below)☒ No

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?

☐ Yes☒ No

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?

☐ Foundation☐ Registered☐ Certified

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?

☐ Yes (If "Yes," give date)☒ No

19. HAS THE VARIETY BEEN RELEASED, OFFERED FOR SALE, OR MARKETING IN THE U.S. OR OTHER COUNTRIES?

☐ Yes (If "Yes," give names of countries and dates)☒ No

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT

SIGNATURE OF APPLICANT

DATE

3/12/87

DATE

Exhibit A

'LH156' was developed through a pedigreed system of breeding. On the following page is a schmatic description of the development of 'LH156'. Also included are copies of pages from Holden's Foundation Seeds nursery books. The rows associated with the development of 'LH156' have been highlighted.

Attached is a statement from the originating plant breeder, David Harper, Holden's Foundation Seeds, stating that the line is uniform, stable and free of variance from within the population .

Exhibit A

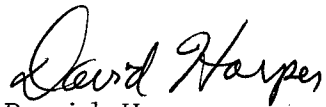
Origin and Breeding History of the Inbred 8700090
LH156= Ex1120= Va85 x Pa91

<u>Row</u>	<u>Pedigree</u>	<u>Location</u>	<u>Year</u>
S.McCune	LH156	Iowa	1986
5328-5337	Ex1120	Iowa	1985
7802	Va85 x Pa91 1 ⁸	Iowa	1984
11943	Va85 x Pa91 1 ⁷	Hawaii	1983-84
22755	Va85 x Pa91 1 ⁶	Iowa	1983
7054	Va85 x Pa91 1 ⁵	Hawaii	1982-83
3252	Va85 x Pa91 1 ⁴	Iowa	1982
3747	Va85 x Pa91 1 ³	Hawaii	1981-82
21697	Va85 x Pa91 1 ²	Iowa	1981
575	Va85 x Pa91 1 ¹	Hawaii	1981
326	Va85 x Pa91	Hawaii	1980

Exhibit A

Uniformity Statement

I have observed 'LH156' during the two generations it has been increased, Iowa nursery rows 5328-5337 and Iowa South McCune Field 1986. In each of the increases the seeds from the previous generation were planted. The line is very stable and uniform. It is also free of variance from within the population.



David Harper
Plant Breeder

Exhibit B

Novelty Statement

'LH156' most closely resembles 'Pa91'; however, the most distinguishing characteristic is the tassel. Specifically the differences in the tassels are with the colors of the glumes and anthers. The glume color of 'LH156' is streaked half green and half purple. The glume also has a purple ring at the base of the glume. The glume of 'Pa91' is green and no other markings are present. The anther color of 'LH156' is a mixture of purple and yellow whereas the anther color of 'Pa91' is plain yellow. These differences can be seen in the photographs below.



Notice the 'LH156' tassel (on the left) has purple on both the glume and anther while the 'Pa91' tassel (on the right) has no purple on either the glume or anther.

OBJECTIVE DESCRIPTION OF VARIETY
CORN (ZEA MAYS)

6514-6520

NAME OF APPLICANT(S)

Holden's Foundation Seeds, Inc.

ADDRESS (Street and No. or R.F.D. No., City, State, and ZIP Code)

R.R.#2, Box 839

Williamsburg, IA 52361

FOR OFFICIAL USE ONLY

PVPO NUMBER

8700090

VARIETY NAME OR TEMPORARY
DESIGNATION

'LH156'

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g., or) when number is either 99 or less or 9 or less.

1. TYPE:

 1 = SWEET 2 = DENT 3 = FLINT 4 = FLOUR 5 = POP 6 = ORNAMENTAL

2. REGION WHERE BEST ADAPTED IN THE U.S.A.:

 1 = NORTHWEST 2 = NORTHCENTRAL 3 = NORTHEAST 4 = SOUTHEAST
5 = SOUTHCENTRAL 6 = SOUTHWEST 7 = MOST REGIONS

3. MATURITY (In Region of Best Adaptability):

(Under "comments" (pg. 3) state how
heat units were calculated) DAYS FROM EMERGENCE TO 50% OF PLANTS IN SILK HEAT UNITS DAYS FROM 50% SILK TO OPTIMUM EDIBLE QUALITY HEAT UNITS DAYS FROM 50% SILK TO HARVEST AT 25% KERNEL MOISTURE HEAT UNITS

4. PLANT:

 CM. HEIGHT (To tassel tip) CM. EAR HEIGHT (To base of top ear) CM. LENGTH OF TOP EAR INTERNODE

Number of Tillers:

 1 = NONE 2 = 1-2 3 = 2-3 4 = > 3

Number of Ears Per Stalk:

 1 = SINGLE 2 = SLIGHT TWO-EAR TENDENCY
3 = STRONG TWO-EAR TENDENCY 4 = THREE-EAR TENDENCY

Cytoplasm Type:

 1 = NORMAL 2 = "T" 3 = "S" 4 = "C" 5 = OTHER (Specify) _____

5. LEAF (Field Corn Inbred Examples Given):

5GY4/4 Munsell Color Charts for Plant Tissues.

Color: 1 = LIGHT GREEN (HY) 2 = MEDIUM GREEN (WF9) 3 = DARK GREEN (B14) 4 = VERY DARK GREEN (K166)

Angle from Stalk (Upper half):

 1 = < 30° 2 = 30-60° 3 = > 60°

Sheath Pubescence:

 1 = LIGHT (W22) 2 = MEDIUM (WF9)
3 = HEAVY (OH26)

Marginal Waves:

 1 = NONE (HY) 2 = FEW (WF9) 3 = MANY (OH7L)

Longitudinal Creases:

 1 = ABSENT (OH51) 2 = FEW (OH56A)
3 = MANY (PA11)

Width:

 CM. WIDEST POINT OF EAR NODE LEAF

Length:

 CM. EAR NODE LEAF NUMBER OF LEAVES PER MATURE PLANT

6. TASSEL:

0 7

NUMBER OF LATERAL BRANCHES

Branch Angle from Central Spike:

Penduncle Length:

2

1 = < 30°

2 = 30-40°

3 = > 45°

0 6

CM. FROM TOP LEAF TO BASAL BRANCHES

Pollen Shed:

2

1 = LIGHT (WF9)

2 = MEDIUM

3 = HEAVY (KY21)

6

Anther Color:

1 = YELLOW

2 = PINK

3 = RED

4 = PURPLE

5 = GREEN

6

Glume Color:

6 = OTHER (Specify)

purple & yellow

green with purple stripe & ring at base.

Pollen Restoration for Cytoplasm (o = Not Tested, 1 = Partial, 2 = Good)

0

"T"

0

"S"

0

"C"

0

OTHER (Specify Cytoplasm and degrees of restoration)

7. EAR (Husked Ear Data Except When Stated Otherwise):

1 7

CM LENGTH

3 7

MM. MID-POINT
DIAMETER

9 5

GM. WEIGHT

Kernel Rows:

1

1 = INDISTINCT

2 = DISTINCT

1 4

NUMBER

1

1 = STRAIGHT

2 = SLIGHTLY CURVED

3 = SPIRAL

Silk Color (Exposed at Silking Stage):

2

1 = GREEN

2 = PINK

3 = SALMON

4 = RED

Husk Color:

1

FRESH

1 = LIGHT GREEN

2 = DARK GREEN

3 = PINK

6

DRY

4 = RED

5 = PURPLE

6 = BUFF

Husk Extension: (Harvest Stage)

Husk Leaf:

3

1 = SHORT (Ears Exposed) 2 = MEDIUM (Barely Covering Ear)

3 = LONG (8-10CM Beyond Ear Tip)

4 = VERY LONG (> 10 CM)

1

1 = SHORT (< 8 CM)

2 = MEDIUM (8-15 CM)

3 = LONG (> 15 CM)

Shank:

Position at Dry Husk Stage:

0 7

CM LONG

7

NO. OF INTERNODES

1

1 = UPRIGHT

2 = HORIZONTAL

3 = PENDENT

Taper:

Drying Time (Unhusked Ear):

1

1 = SLIGHT

2 = AVERAGE

3 = EXTREME

2

1 = SLOW

2 = AVERAGE

3 = FAST

8. KERNEL (Dried):

Size (From Ear Mid-Point):

1 0

MM LONG

0 9

MM. WIDE

0 4

MM. THICK

Shape Grade (% Rounds)

4

1 = < 20

2 = 20-40

3 = 40-60

4 = 60-80

5 = > 80

7

8. KERNEL (Dried) :

1

Pericarp Color:

1 = COLORLESS

2 = RED-WHITE CROWN

3 = TAN

4 = BRONZE

5 = BROWN

6 = LIGHT RED

7 = CHERRY RED

8 = VARIEGATED (Describe)

1

Aleurone Color:

1 = HOMOZYGOUS

2 = SEGREGATING (Describe)

1

1 = WHITE

2 = PINK

3 = TAN

4 = BROWN

5 = BRONZE

6 = RED

7 = PURPLE

8 = PALE PURPLE

9 = VARIEGATED (Describe)

3

Endosperm Color:

1 = WHITE

2 = PALE YELLOW

3 = YELLOW

4 = PINK-ORANGE

5 = WHITE CAP.

Endosperm Type:

3

1 = SWEET (su1)

2 = EXTRA SWEET (sh2)

3 = NORMAL STARCH

4 = HIGH AMYLOSE STARCH

5 = WAXY STARCH

6 = HIGH PROTEIN

7 = HIGH LYSINE

8 = OTHER (Specify)

2

8

GM. WEIGHT /100 SEEDS (Unsize Sample)

9. COB:

2

4

MM. DIAMETER AT MID-POINT

Strength:

2

1 = WEAK

2 = STRONG

Color:

1

1 = WHITE

2 = PINK

3 = RED

4 = BROWN

5 = VARIEGATED

6 OTHER (Specify)

10. DISEASE RESISTANCE (0 = Not Tested, 1 = Susceptible, 2 = Resistant):

0

STALK ROT (Diplodia)

0

STALK ROT (Fusarium)

0

STALK ROT (Gibberella)

0

NORTHERN LEAF BLIGHT

0

SOUTHERN LEAF BLIGHT

0

SMUT

0

SOUTHERN RUST

0

CORN SMUT

0

BACTERIAL WILT

0

BACTERIAL LEAF BLIGHT

0

MAIZE DWARF MOSAIC

0

STUNT

0

OTHER (Specify)

11. INSECT RESISTANT (0 = Not Tested, 1 = Susceptible, 2 = Resistant):

0

CORNBORER

0

EARWORM

0

SAPBEETLE

0

APHID

0

ROOTWORM (Northern)

0

ROOTWORM (Western)

0

ROOTWORM (Southern)

0

OTHER (Specify)

12. VARIETIES MOST CLOSELY RESEMBLING THAT SUBMITTED FOR THE CHARACTERS GIVEN:

CHARACTER	VARIETY	CHARACTER	VARIETY
Maturity	Pa91	Kernel Type	Pa91
Plant Type	Pa91	Quality (Edible)	
Ear Type	Pa91	Usage	Pa91

REFERENCES:

U.S. Department Agriculture. Yearbook 1937.

Corn: Culture, Processing, Products. 1970 Avi Publishing Company, Westport, Connecticut. (Numerous (Authors)

Emerson, R.A., G.W. Beadle, and A.C. Fraser. A Summary of Linkage Studies in Maize, Cornell A.E.S., Mem. 180. 1935.

The Mutants of Maize. 1968. Crop Science Society of America. Madison, Wisconsin.

Stringfield, G.H. Maize Inbred Lines of Ohio, Ohio A.E.S. Bul. 831. 1959.

Butler, D.R. 1954 - A System for the Classification of Corn Inbred Lines - PhD. Thesis, Ohio State University.

COMMENTS:

$$GDD = \frac{T_{max} \times T_{min}}{2} - 50^{\circ}F$$

$$T_{max} \leq 86^{\circ}F$$
$$T_{min} \geq 50^{\circ}F$$

8

Exhibit D

Additional Description of the Inbred

'LH56' has some other characteristics that distinguish it from 'Pa91'. The first is cob color. 'LH56' has a white cob while 'Pa91' has a red cob. 'LH56' is shorter in plant height than 'Pa91'. 'LH56' is earlier in maturity than 'Pa91'. 'LH56' reaches mid silk 2 days earlier or 54 GDD earlier than 'Pa91'.

'LH56' and 'Pa91' are both similar in color. Both inbreds are medium dark green and would be classified as 5GY4/4 when using Munsell Color Charts for Plant Tissues as a reference.

Exhibit E

Statement of the Basis of Applicants Ownership

Holden's Foundation Seeds, Inc. Williamsburg, Iowa, believes it is the sole owner and breeder of the 'LH156' field corn inbred for which it solicits a certificate of protection.